

Figure 2.5.2: Old River at LVR Intake Volumetric Source Fingerprint.

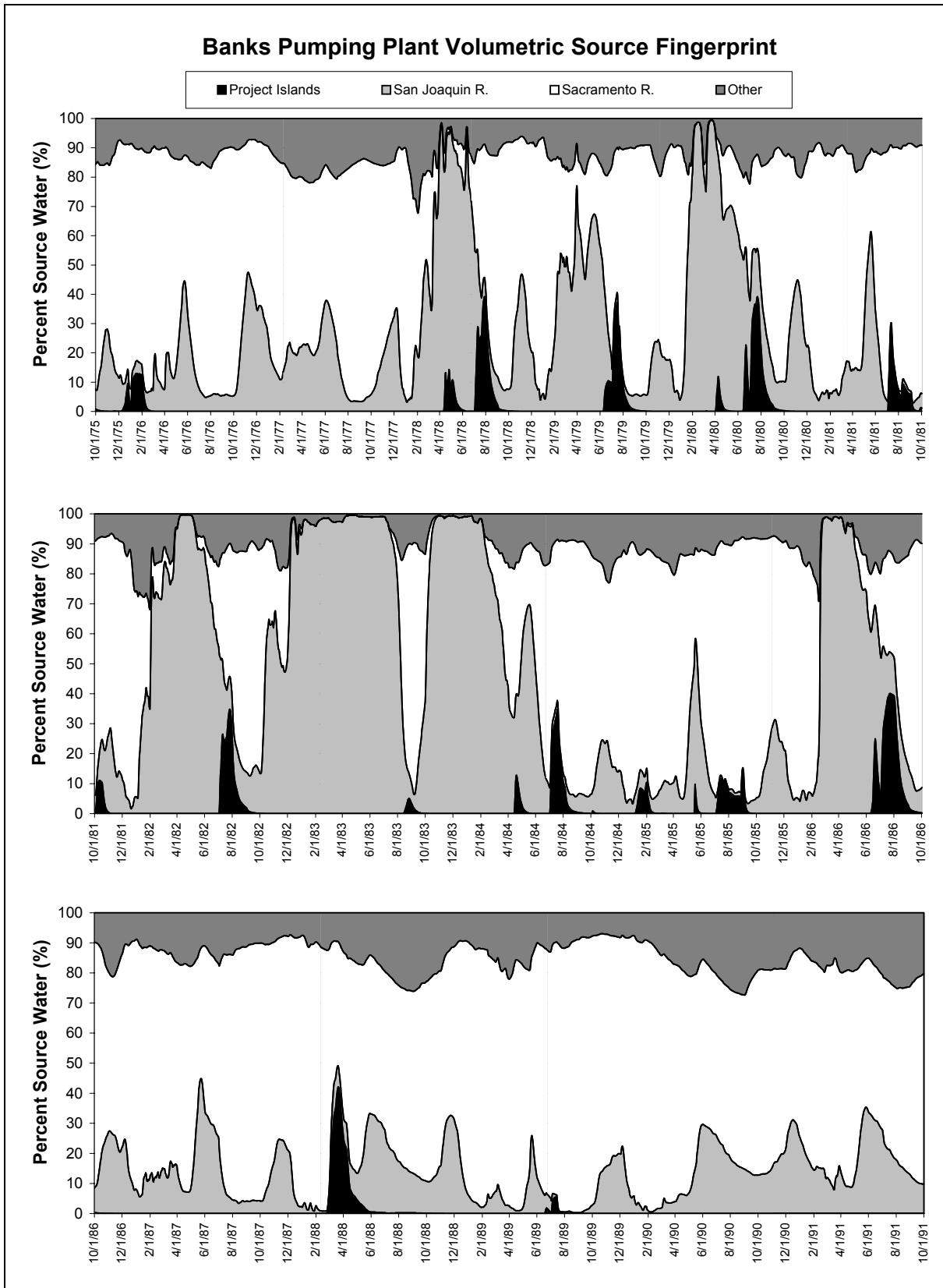


Figure 2.5.3: Banks Pumping Plant Volumetric Source Fingerprint.

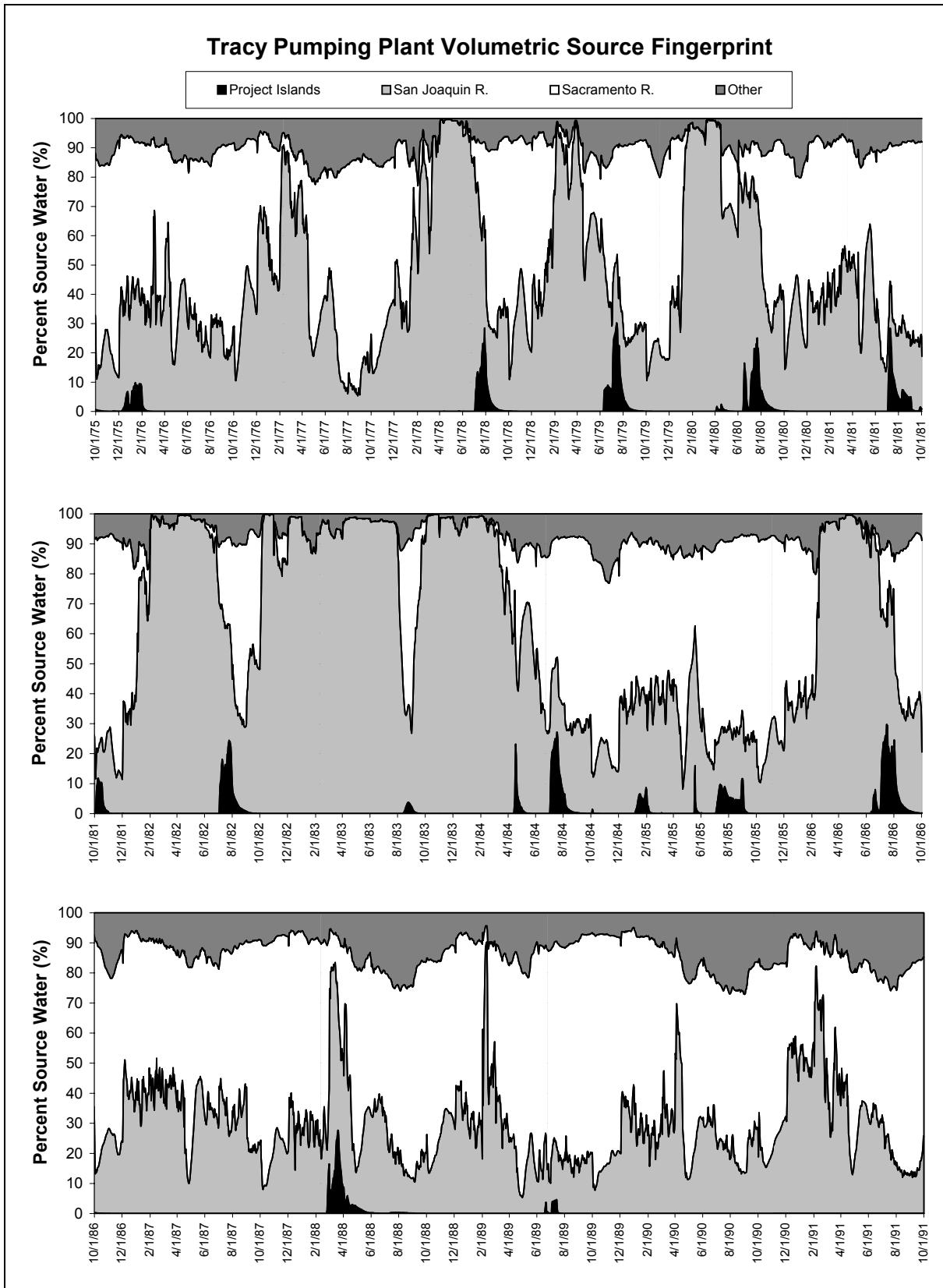


Figure 2.5.4: Tracy Pumping Plant Volumetric Source Fingerprint.

The percentage of total water at each urban intake coming from each island is shown in Figures 2.5.5 – 2.5.8. These percentages were then related to various flow parameters such as: E/I ratio, island releases, Sacramento River inflow, San Joaquin River inflow, total inflows, combined SWP and CVP exports, and combined CCWD diversions. Relationships, based on multiple linear regressions, were developed for each export location for use in CALSIM (see Table 2.5.1). However, since CALSIM does not separate the CCWD diversions, export location project island volume – flow relationships were not developed for CCWD’s Los Vaqueros Reservoir intake (though the fingerprinting results are still shown as they may be useful in addressing other water quality concerns).

The length of time that project release water remains in the Delta is important when developing DOC constraints in CALSIM. Water released at the beginning of a release period would be contributing new organic carbon loads to the urban intakes, whereas water released towards the end of a release period or at the beginning of a release period shortly after a previous release period needs to take into account the organic carbon already present in the Delta. With this in mind, running averages of the releases were used when developing the project island equations.

The relative orders of magnitude of the variables shown in Table 2.5.1 are listed in Table 2.5.2. Although the hydrodynamics in study 4 did not include a circulation operation similar to the operation CALSIM II optimized in study 4b, modeling and work time constraints prohibited using DSM2 to generate an updated set of equations based on the proposed circulation operation. A formal scale analysis to reduce or simplify the equations 5.1 – 5.9 was not conducted, but each equation was quickly checked using numbers taken from the range listed in Table 2.5.2 and found to yield reasonable results. Next, the equations were added to CALSIM II as shown above.

Table 2.5.1: Percent Volume of Water Project Island at Urban Intakes.

Urban Intake	Island	Relationship	R ²	Eqn. #
RS	Bacon	Apr. – Nov., Q_{SJR} > 8,500 cfs $V = -1.93 \times 10^{-3} Q_{Sac} - 1.3 \times 10^{-3} Q_{SJR} + 1.2 \times 10^{-3} Q_{inflow} + 1.27 \times 10^3 Q_{SWP+CVP}$ $- 4.4 \times 10^2 E/I - 6.43 \times 10^3 Q_{CCWD} + 1.02 \times 10^{-2} Q_{Bacon, 20-day ave} - 9.79 \times 10^6$	0.84	5.1
		Apr. – Nov., Q_{SJR} ≤ 8,500 cfs $V = 0.05$	N/A	5.2
		Dec. – Mar., E/I ≤ 0.37 $V = 1.89 \times 10^{-2} Q_{Sac} + 2.49 \times 10^{-2} Q_{SJR} - 2.0 \times 10^{-3} Q_{inflow} - 5.58 \times 10^{-2} Q_{SWP+CVP}$ $+ 7.80 \times 10^2 E/I - 1.0860 \times 10^2 Q_{CCWD} + 1.43 \times 10^{-2} Q_{Bacon, 20-day ave} + 1.05 \times 10^4$	0.92	5.3
		Dec. – Mar., E/I > 0.37 $V = -1.16 \times 10^{-5} Q_{Sac} + 1.83 \times 10^{-5} Q_{SJR} + 4.71 \times 10^{-7} Q_{inflow} - 6.03 \times 10^{-6} Q_{SWP+CVP}$ $- 1.4 \times 10^{-1} E/I + 5.60 \times 10^{-4} Q_{CCWD} + 3.36 \times 10^{-4} Q_{Bacon, 20-day ave} + 1.6 \times 10^{-1}$	0.88	5.4
	Webb	$V = 8.8 \times 10^{-3} Q_{Webb, 20-day ave} + 8.5 \times 10^{-2}$	0.90	5.5
SWP	Bacon	$V = 2.56 \times 10^{-4} Q_{SWP+CVP} - 3.6 \times 10^{-4} Q_{SWP} + 1.9 \times 10^{-1} E/I$ $+ 5.2 \times 10^{-3} Q_{Webb, 20-day ave} - 3.69 \times 10^{-1}$	0.80	5.6
	Webb	$V = -6.54 \times 10^{-1} E/I + 1.13 \times 10^{-2} Q_{Bacon, 18-day ave} + 4.77 \times 10^{-1}$	0.70	5.7
CVP	Bacon	$V = 6.1 \times 10^{-3} Q_{Bacon, 8-day ave} + 1.67 \times 10^{-1}$	0.69	5.8
	Webb	$V = -5.2 \times 10^{-6} Q_{SWP+CVP} + 2.01 \times 10^{-4} Q_{CVP} + 3.07 \times 10^{-1} E/I$ $+ 3.6 \times 10^{-3} Q_{Webb, 20-day ave} - 2.59 \times 10^{-1}$	0.79	5.9

Table 2.5.2: Sensitivity of Flow Parameters in Table 5.1.

Variable	Flow Parameter	Range of Values
E/I	Delta export / inflow ratio	0 – 1
Q _{CCWD}	Contra Costa WD diversions	0 – 600 cfs
Q _{Bacon, 8-day}	8-day average of Bacon Island releases	0 – 2,500 cfs
Q _{Bacon, 20-day}	20-day average of Bacon Island releases	0 – 2,500 cfs
Q _{Webb, 20-day}	20-day average of Webb Tract releases	0 – 2,500 cfs
Q _{CVP}	CVP exports	0 – 5,000 cfs
Q _{SWP+CVP}	Combined SWP & CVP exports	1,500 – 13,000 cfs
Q _{SJR}	San Joaquin River flow	1,000 – 50,000 cfs
Q _{Sac}	Sacramento River flow	5,000 – 80,000 cfs
Q _{inflow}	Total Delta inflows	6,000 – 200,000 cfs